COLORECTAL CANCER

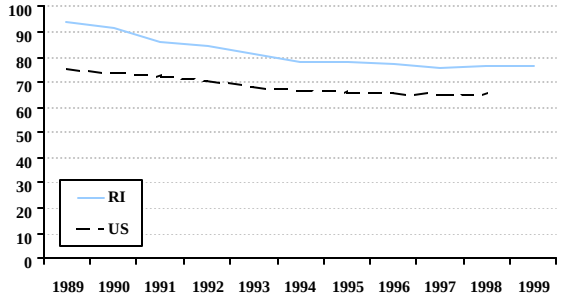
Colorectal cancer starts out as a small, grape-like growth on the lining of either the colon or the rectum (these two body parts make up the large intestine). This growth may become cancerous and form a malignant tumor. (RICAN)

Colorectal cancer is the fourth most commonly diagnosed cancer among Rhode Islanders (annual average of 359 male and 391 female newly diagnosed cases in each of the five years 1997-2001), accounting for 13% of all newly diagnosed cancers in 1997-2001. Colorectal cancer is the second leading cause of cancer death in RI (annual average of 130 male and 149 female deaths in each of the five years 1996-2000), accounting for 11% of all cancer deaths in 1996-2000. In Rhode Island, approximately 4,700 people alive today were diagnosed with colorectal cancer at some point in the past 25 years (2,216 males and 2,476 females in 2000). (RICR)

Cancer Rates

Figure 8-1. Male colorectal cancer incidence by year

Average annual invasive colorectal cancer incidence rates** by year among males, RI and US, 1987-2001***.*



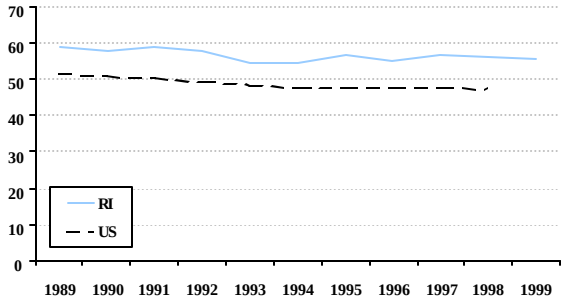
* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH – calculated with *SEER*Stat*; *SEER Cancer Statistics Review, 1973-1999;* 1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

The age-adjusted incidence of invasive colorectal cancer among RI males of all races decreased from about 94 cases per 100,000 males in 1989 to about 76 cases per 100,000 males in 1999 (based on five-year moving averages). The age-adjusted incidence of invasive colorectal cancer among US males of all races decreased from 75 cases per 100,000 males in 1989 to about 65 cases per 100,000 males in 1998 (based on five-year moving averages). RI colorectal cancer incidence rates for males were higher than US rates throughout the period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-2. Female colorectal cancer incidence by year

Average annual invasive colorectal cancer incidence rates** by year among females, RI and US, 1987-2001***.*



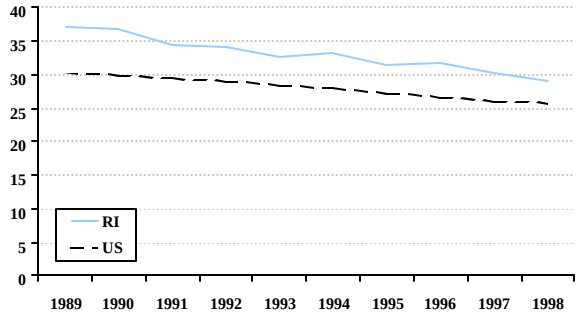
* Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown.
** Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
*** Rates are five-year moving averages.
Source: RICR, HEALTH – calculated with *SEER*Stat*; *SEER Cancer Statistics Review, 1973-1999;* 1998 US data is from SEER Public-Use 1973-2000 Data – calculated with *SEER*Stat*.

The age-adjusted incidence of invasive colorectal cancer among RI females of all races from 1989 to 1999 decreased from about 59 cases per 100,000 females to about 55 (based on five-year moving averages). Similarly, the age-adjusted incidence of invasive colorectal cancer among US females of all races decreased from about 52 cases per 100,000 females in 1989 to about 47 cases per 100,000 females in 1998 (based on five-year moving averages). RI colorectal cancer incidence rates for females were higher than US rates throughout the period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-3. Male colorectal cancer mortality by year

Average annual colorectal cancer mortality rates by year among males, RI and US, 1987-2000**.*



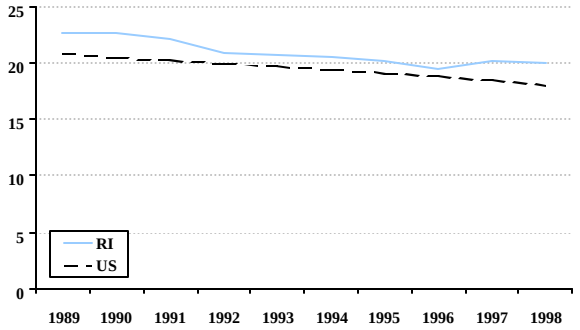
* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: CDC WONDER, CDC; 1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

The age-adjusted mortality of invasive colorectal cancer among RI males of all races declined from 37 deaths per 100,000 in 1989 to 30 deaths per 100,000 in 1998 (based on five-year moving averages). Similarly, the age-adjusted mortality of invasive colorectal cancer among US males of all races declined from 30 in 1989 to 26 in 1998 (based on five-year moving averages). RI colorectal cancer mortality rates for males were higher than US rates throughout the period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-4. Female colorectal cancer mortality by year

Average annual colorectal cancer mortality rates by year among females, RI and US, 1987-2000**.*



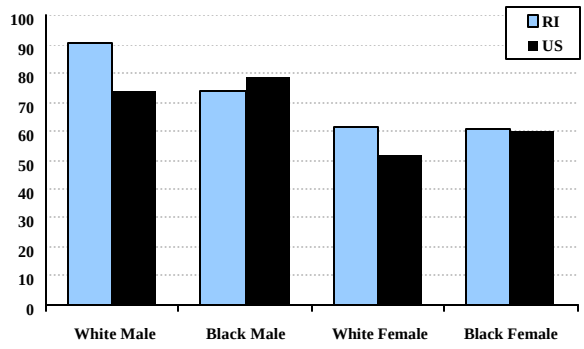
* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
** Rates are five-year moving averages.
Source: CDC WONDER, CDC; 1998 US data is from SEER US Mortality 1969-2000 Data – calculated with *SEER*Stat*.

The age-adjusted mortality of invasive colorectal cancer among RI females of all races declined from 23 deaths per 100,000 in 1989 to 20 deaths per 100,000 in 1998 (based on five-year moving averages). Similarly, the age-adjusted mortality of invasive colorectal cancer among US females of all races declined from 21 in 1989 to 18 in 1998 (based on five-year moving averages). RI colorectal cancer mortality rates for females were slightly higher than US rates throughout the period of observation.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-5. Colorectal cancer incidence by race and sex

Average annual invasive colorectal cancer incidence rates by race and sex, RI and US, 1987-2000.*



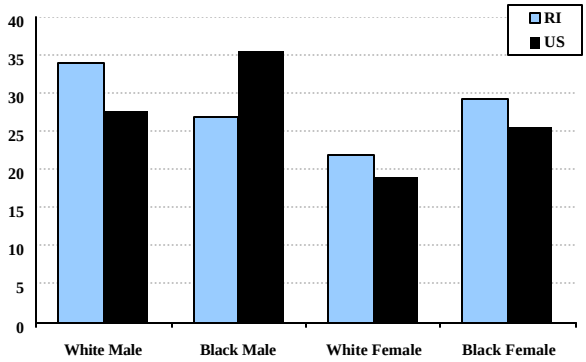
* Rates are age-adjusted to the year 2000 US standard population, expressed as cases per 100,000 population.
Source: RICR, HEALTH; SEER Public-Use 1973-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, colorectal cancer incidence rates in RI were higher among white males (91 cases per 100,000) than black males (74 cases per 100,000). In the US, male rates were slightly higher among blacks. Female colorectal cancer incidence rates during this period were similar among whites and blacks in RI (61 cases per 100,000), and slightly higher among blacks than whites in the US.

[Note: RI incidence data for 2001 is currently available. US incidence data is only available through 2000. For comparability, the figure at left contains RI data through 2000.]

Figure 8-6. Colorectal cancer mortality by race and sex

Average annual colorectal cancer mortality rates by race and sex, RI and US, 1987-2000.*

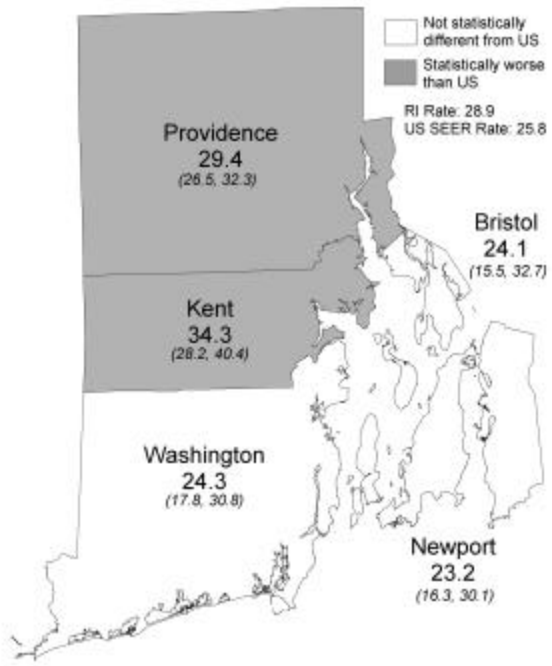


* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000 population.
Source: Office of Vital Records, HEALTH; SEER US Mortality 1969-2000 Data; calculated with *SEER*Stat*.

In 1987-2000, colorectal cancer mortality rates in RI were higher among white males (34 deaths per 100,000) than black males (27 deaths per 100,000). In the US, male rates were higher among blacks. Female colorectal cancer mortality rates during this period were higher among black females (29 deaths per 100,000) than white females (22 deaths per 100,000) in RI. The same was true for colorectal cancer mortality rates among US females.

Figure 8-5. Male colorectal cancer mortality by county

Average annual colorectal cancer mortality rates among males by county and statistical difference from US rates, RI, 1996-2000.*

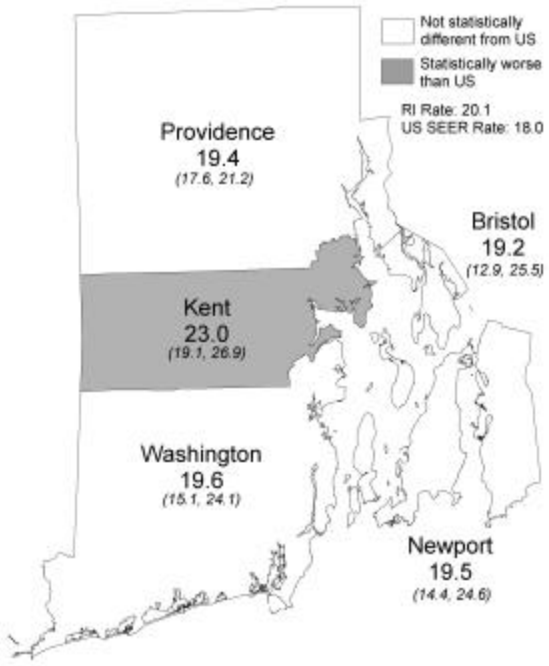


In 1996-2000, average annual colorectal cancer mortality rates among males in Providence county (29 deaths per 100,000) and Kent county (34 deaths per 100,000) were significantly higher than the US rate (26 deaths per 100,000).

[Note: Maps are color-coded based on comparison to US mortality rates. When the US rates fall within the 95% confidence interval (shown in parentheses), it suggests that there is no statistical difference. Please see Key for Maps in **About the Data** (section 3) for a clear delineation of counties.]

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000.
Data source: Office of Vital Records, HEALTH; calculated with *SEER*Stat*.
Map source: HEALTH gis.

Figure 8-6. Female colorectal cancer mortality by county
Average annual colorectal cancer mortality rates among females by county and statistical difference from US rates, RI, 1996-2000.*



In 1996-2000, average annual colorectal cancer mortality rates among females in Kent county (23 deaths per 100,000) were significantly higher than the US rate (18 deaths per 100,000).

[Note: Maps are color-coded based on comparison to US mortality rates. When the US rates fall within the 95% confidence interval (shown in parentheses), it suggests that there is no statistical difference. Please see Key for Maps in **About the Data** (section 3) for a clear delineation of counties.]

* Rates are age-adjusted to the year 2000 US standard population, expressed as deaths per 100,000.
Data source: Office of Vital Records, HEALTH; calculated with *SEER*Stat* .
Map source: HEALTH gis.

Healthy People 2010 **Targets**
Mortality: By 2010, reduce the colorectal cancer death rate to 13.9 deaths per 100,000 population (age-adjusted to the year 2000 standard population of the United States; baseline = 21.2 deaths per 100,000 population in 1998).

Risk Factors

Persons at increased risk for colorectal cancer include those with uncommon familial syndromes (i.e., heredity polyposis and hereditary nonpolyposis colorectal cancer), or longstanding ulcerative colitis. Family history of colorectal cancer, personal history of large adenomatous polyps, personal history of colorectal cancer, and prior diagnosis of endometrial, ovarian, or breast cancer are also associated with increased risk. (Clinical)

Prior to 1999 it was believed that a diet high in fiber helped reduce the incidence of colorectal cancer. "Increasing evidence suggests that diets high in fiber-containing foods are associated with a reduced risk for cancer, especially cancer of the colon." (NIH) In 1999, Harvard Medical School published a landmark study, based on the Nurses' Health Study, which did not support the salutary effects of fiber on the incidence of colorectal cancer. (Fuchs)

Prevention

Although colorectal cancer has been linked to a variety of risk factors, which preventive measures are effective has been questioned. Currently, colorectal cancer screening tests may be the most clinically significant strategy for the prevention of colorectal cancer.

Screening

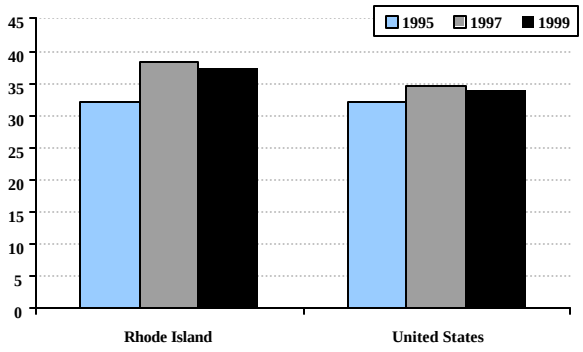
Screening tests for colorectal cancer include sigmoidoscopy, colonoscopy, fecal occult blood test (FOBT), barium enema, and digital rectal examination (DRE). A number of clinical trials have demonstrated the effectiveness of screening for the reduction of colorectal cancer mortality. (HP) A preferred strategy for colorectal cancer screening is early detection with endoscopic tests (sigmoidoscopy or colonoscopy) because of the added advantage that precancerous polyps may be removed during the procedure, thus preventing the development of cancer.

The American Cancer Society recommends (ACS):

- Beginning at age 50, both men and women should follow **one** of the five screening options below:
    - A fecal occult blood test (FOBT) every year (the take-home multiple sample method should be used),
    - A fecal occult blood test every year plus flexible sigmoidoscopy every 5 years,
    - Flexible sigmoidoscopy every 5 years,
    - (Of these first 3 options, the combination of FOBT every year and flexible sigmoidoscopy every 5 years is preferable.)
    - Double-contrast barium enema every 5 years, or
    - Colonoscopy every 10 years.

Figure 8-9. Male colorectal cancer screening by year

Percent of male respondents 40 and older who have ever been screened for colorectal cancer by year, RI and US, 1995-1999.*



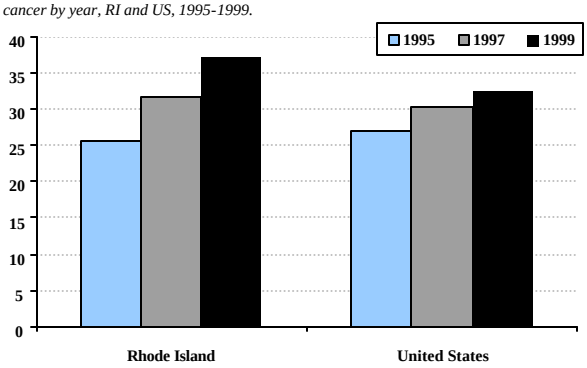
* Type of screening test (proctoscopic exam, sigmoidoscopy, or colonoscopy) differs by year.
Source: RI-BRFSS, HEALTH; BRFSS, CDC.

The proportion of RI males of all ages and races who had ever received some form of colorectal screening exam (sigmoidoscopy, colonoscopy, or proctoscopic exam depending on year of study) increased from 32% in 1995 to 37% in 1999. Among all the states, in comparison, the median proportion of males of all ages and races who had ever been screened for colorectal cancer increased from 32% in 1995 to 34% in 1999.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-10. Female colorectal cancer screening by year

Percent of female respondents 40 and older who have ever been screened for colorectal cancer by year, RI and US, 1995-1999.*



* Type of screening test (proctoscopic exam, sigmoidoscopy , or colonoscopy) differs by year.
Source: RI -BRFSS, HEALTH; BRFSS, CDC.

The proportion of RI females of all ages and races who had ever received some form of colorectal screening exam (sigmoidoscopy, colonoscopy, or proctoscopic exam depending on year of study) increased from 26% in 1995 to 37% in 1999. Among all the states, in comparison, the median proportion of females of all ages and races who had ever been screened for colorectal cancer increased from 27% in 1995 to 32% in 1999.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

[Note: Indicators for colorectal screening must be interpreted with caution because they are different for each of the years 1995, 1997, and 1999. Data for 1995 indicate percent population that had ever had a proctoscopic exam. Data for 1997 indicate percent population that had ever had a sigmoidoscopy or proctoscopic exam. Data for 1999 indicate percent population that had ever had a sigmoidoscopy or colonoscopy exam.]

From 1989 to 1999, trends in stage-specific colorectal cancer incidence rates are consistent with screening rates. When broken down by stage of disease at diagnosis, there was an increase of *in situ* colorectal tumors, decrease of local and regional colorectal tumors, and decrease or no significant change in the incidence of distant colorectal tumors or tumors of unknown stage.

***Healthy People 2010* Targets**
Screening: By 2010, increase the proportion of adults aged 50 years and older who have ever received a sigmoidoscopy to 50% (baseline = 37% in 1998). Increase the proportion of adults aged 50 years and older who have received a fecal occult blood test (FOBT) within the preceding two years to 50% (baseline = 35% in 1998).

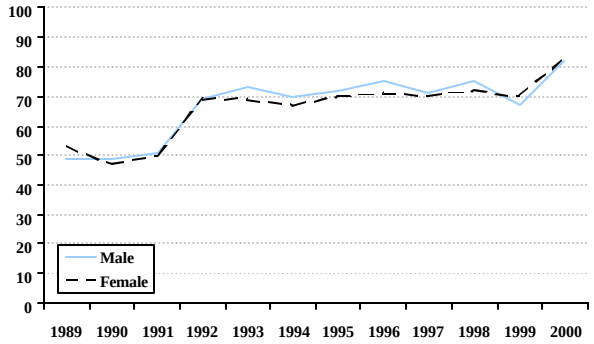
Treatment

Surgical options differ for colon cancer and rectal cancer. However, non-surgical options (radiation and chemotherapy) are the same for both cancers. Surgical treatment options for colon cancer include colonoscopy and surgery. Surgical treatment options for rectal cancer include polypectomy, local excision, local full thickness resection, and electrofulgeration. More advanced stages of rectal cancer may require other types of surgery. A common surgical procedure for advanced stages of rectal cancer is a colostomy. Non-surgical treatment options for colon and rectal cancer include radiation therapy and chemotherapy. (RICAN)

The percent of colorectal cancer cases in RI ACOS-approved treatment programs and the percent staged with AJCC staging methodology is detailed below.

Figure 8-11. Colorectal cancer in ACOS programs by year and sex

Percent of colorectal cancer cases treated in ACOS approved cancer treatment programs by year and sex, RI, 1989-2000.

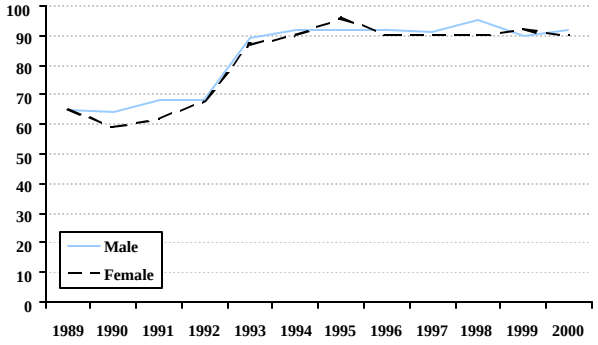


Source: RICR, HEALTH

The percent of colorectal cancer case reports from ACOS approved hospital cancer treatment programs in RI increased from about 50% in 1989 to about 70% in 1992, for both males and females. This proportion varied around 70% until 2000, when it increased to 82% for males and 83% for females.

Figure 8-12. Colorectal cancer with AJCC staging by year and sex

Percent of colorectal cancer cases staged with AJCC staging methodology by year and sex, RI, 1989-2000.

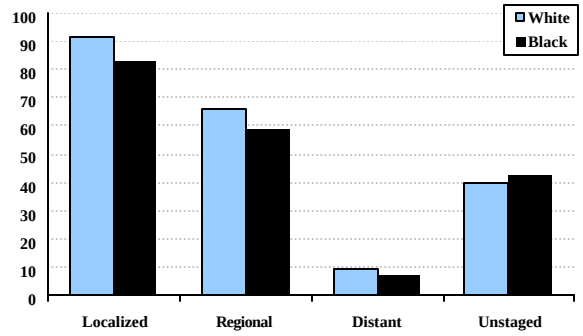


Source: RICR, HEALTH

Prior to a change in the Rules and Regulations of the Rhode Island Cancer Registry in 1992, only about 65% of the colorectal cancer cases newly diagnosed among RI males and females were staged using the AJCC system. After the Rules change, the proportion of cases with AJCC staging increased to 89% among males and 87% among women, and from 1993 through 2000 has averaged 92% and 91% for males and women, respectively.

Survival

Figure 8-13. Male colorectal cancer survival rates by race and stage
Invasive colorectal cancer five-year relative survival rates by race and stage of disease at diagnosis among males, US, 1992-1999.*

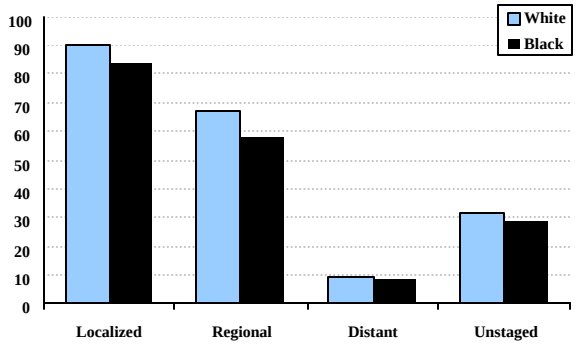


* Survival rates are relative rates expressed as percents.
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for male colorectal cancer are higher when diagnosed at earlier stages of disease, and are higher among white males than black males. Colorectal cancers diagnosed while localized have a survival rate of 91% among white males and 83% among black males. Cancers that are not diagnosed until a distant stage have a survival rate of 9% among whites and 7% among blacks.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Figure 8-14. Female colorectal cancer survival rates by race and stage
Five year relative invasive colorectal cancer survival rates by race and stage of disease at diagnosis among females, US, 1992-1999.*



* Survival rates are relative rates expressed as percents.
Source: *SEER Cancer Statistics Review, 1975 -2000.*

Based on US data from 1992-1999, five-year relative survival rates for female colorectal cancer are higher when diagnosed at earlier stages of disease, and are higher among white females than black females. Colorectal cancers diagnosed while localized have a survival rate of 90% among white females and 84% among black females. Cancers that are not diagnosed until a distant stage have a survival rate of 10% among whites and 9% among blacks.

[Note: Separate graphs for males and females may not have the same y-axis scale.]

Discussion

Summary of Burden

Colorectal cancer contributes substantially to the cancer burden in Rhode Island.

Colorectal cancer is the fourth most commonly diagnosed cancer and the second leading cause of cancer death. Approximately 4,700 Rhode Islanders alive today were diagnosed with colorectal cancer at some point in the past 25 years.

In Rhode Island, the incidence of colorectal cancer declined in the 1990's, probably because of aggressive screening.

This decline is likely due to an increase in colorectal cancer screening, which is effective in finding precancerous lesions that can be removed before they progress into cancer.

Relative Burden

Rhode Islanders have higher colorectal cancer rates than Americans as a whole.

This gap began to narrow in the late 1990's.

Disparities

In Rhode Island, the burden of colorectal cancer is greater among men than women.

This differential began to decrease in the late 1990's.

In Rhode Island, the burden of colorectal cancer is higher among white men than black men.

In 1987-2000, white men in Rhode Island were more likely to be diagnosed with and to die from colorectal cancer than black men. This contrasts with the United States experience where the opposite was true.

The burden of colorectal cancer is greater in Kent and Providence counties than in the nation as a whole.

High colorectal cancer mortality rates may indicate a lag in endoscopic screening in Kent and Providence counties, and is worthy of further study to test this and other possible reasons for the differential.

Status of Control Strategies

The burden of colorectal cancer may be reduced by screening persons according to guidelines and by assuring state-of-the-art treatment for all colorectal cancer patients. Endoscopic colorectal cancer screening tests, much like screening tests for cervical cancer, find precancerous lesions that can be removed before they progress into cancer, and thus are effective preventives. Another important control strategy is to assure state-of-the-art treatment for all cancer patients through improvement of basic treatment infrastructure.

In Rhode Island, the proportion of persons screened for colorectal cancer increased in the 1990's, but is still low.

From 1995 to 1999, Rhode Island edged ahead of the United States in the proportions of people ages 40 and over ever screened for colorectal cancer. Despite this progress, considerable work is needed to reach the 63% of RI men and women who have never been screened for colorectal cancer.

In Rhode Island, screening with endoscopy is likely responsible for the decrease in colorectal cancer incidence.

Increased use of endoscopy for colorectal cancer screening is likely responsible for the recent decrease in colorectal cancer incidence. The effectiveness of colorectal cancer screening is reflected in trends of stage-specific colorectal cancer incidence rates, analyzed in previous reports (Review). Over the course of the 1990's in RI, the incidence of *in situ* colorectal tumors increased, while the incidence of local and regional colorectal tumors decreased, signs of effective screening.

By the year 2000, 8 out of 10 colorectal cancer case reports in Rhode Island were from American College of Surgeons (ACOS) approved hospitals.

By the year 2000, 9 out of 10 colorectal tumors in Rhode Island were staged with American Joint Committee on Cancer (AJCC) methodology.

Cancer Control Priorities for 2004

Reduce the burden of colorectal cancer by increasing the proportion of Rhode Islanders screened for colorectal cancer according to guidelines.

Increase the proportion of Rhode Islanders screened for colorectal cancer according to guidelines by (a) promoting awareness of major risk factors such as family history and (b) promoting use of screening tests, especially colonoscopy, throughout the population, as current screening rates are low.

Reduce the burden of colorectal cancer by increasing the proportion of colorectal cancer patients who receive state-of-the-art treatment.

Begin to eliminate disparities by identifying reasons for disparities in relative mortality.

Identify reasons for disparities in relative mortality such as differences in screening and treatment. Conduct a careful analysis of gender, race, and geographic differentials using the Rhode Island Cancer Registry, the Behavioral Risk Factor Surveillance System, the Rhode Island Health Interview Survey, and death certificate data.